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ABSTRACT

Discussed is the standardization process and presented are the norms for deaf children (6-17 years old) on the performance subtests of the Wechsler Intelligence Scale for Children - Revised (WISC-R). Findings of the standardization study (involving 1,228 deaf Ss) are said to include the greatest deaf-hearing discrepancy on the Coding and Picture Arrangement subtests in which deaf children performed significantly below hearing children. In addition to WISC-R norm tables for deaf children between the ages of 6-0-0 and 16-11-30, appendixes include project prospectus and a sample WISC-R background questionnaire. (CL)

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STANDARDIZATION OF THE WISC-R PERFORMANCE SCALE FOR DEAF CHILDREN

Richard J. Anderson
Frankie H. Sisco

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Richard J. Anderson, Ph.D.
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PREFACE

With this publication of norms for hearing impaired children on the Revised Wechsler Intelligence Scale for Children (WISC-R), Gallaudet College's Office of Demographic Studies has broadened the scope of its activities. Whereas all previous publications of the office were authored by its own staff, in this case both the report and the project it describes are the work of other investigators working at other institutions, namely, Dr. Richard Anderson of the University of Florida and Ms. Frankie Sisco of the Florida School for the Deaf and the Blind. In our view, accomplishing our objectives is more important than using only traditional means of doing so.

One of our objectives has long been the investigation and improvement of educational testing procedures used with hearing impaired children, and we have devoted large amounts of time and effort over the years to the improvement of educational achievement testing with hearing impaired children. The outcome of that effort was the development of a Special Edition for Hearing Impaired Children of the 1973 Stanford Achievement Test (SAT-HI) and the national standardization of that test in the spring of 1974, along with the continuing work of distributing the tests and providing consultation and advice on its use and interpretation.

In the case of the WISC-R the necessary task was the development of appropriate norms rather than any revision of the test itself. This work was carried out through the devoted efforts of Ms. Frankie Sisco and Dr. Richard Anderson, who substituted their time and energy for the dollars that would otherwise have been necessary to conduct a project of this scope. The Office of Demographic Studies provided advice and some moral support, but the project was really completely theirs. When, despite all obstacles, they were able to complete the process of project design, data collection and analysis, and the development of norms for hearing impaired children, the only remaining step was to insure that these valuable materials could be made available to psychologists and educators throughout the country. We at the Office of Demographic Studies are happy to be able to provide the means of making this information available to the nation, in order to improve the accuracy and validity of intellectual assessments of hearing impaired children.

The Education for All Handicapped Children Act (Public Law 94-142) has supported and reaffirmed the long-standing psychometric principle that testing procedures must be appropriate for the group of people with whom they are used. With the publication of this report a significant advance in this direction has been made regarding the intellectual assessment of children with substantial hearing impairment. The thanks of all of us must go to the authors of this report for this advance.

Just as this is not the first step the Office of Demographic Studies has taken toward the improvement of educational and psychological assessment, so we are confident that it will not be our last contribution. We invite all interested parties to join us in this important work.

Raymond J. Trybus, Director
Office of Demographic Studies
Gallaudet College
Washington, D.C.

October, 1977

ABSTRACT

The performance scale of the WISC-R was standardized on a national sample of 1,228 deaf children. Data were collected from 18 residential and four day schools for the deaf located throughout the United States. The characteristics of the deaf sample were similar to those of Wechsler's WISC-R hearing sample. Information concerning the "hearing status of the parents" and the "communication method" used during testing is reported. Norms for deaf children between the ages of 6-0-0 and 16-11-30 are presented and the statistical procedures used to compute the norms described.

Deaf children performed similarly to hearing children on all performance subtests except Coding and Picture Arrangement; deaf children, particularly young, low-scoring deaf children, performed significantly below their hearing peers on these subtests. More raw score variance occurred within the deaf sample at all age groupings and on all subtests. Significant differences (beyond the .01 level) between the two groups were also found in the subtest scaled score patterns, the mean performance IQ scores, and the standard deviations.

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Standardization of the WISC-R Performance Scale for Deaf Children

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INTRODUCTION

There is a generally recognized need for improved psychological evaluation of deaf children so that more appropriate personal and educational planning based on psychological assessment can be achieved. Since its inception in 1949, the Wechsler Intelligence Scale for Children (WISC) has been the most widely used test of mental ability with deaf as with hearing children (Levine, 1974). General background information with respect to research on the WISC can be found in Buros (1972), *Seventh Mental Measurements Yearbook*, and the six prior yearbooks.

The WISC has five subtests from which a verbal IQ can be derived and five subtests from which a performance IQ can be derived. The verbal IQ and the subtests upon which it is based have often proved inappropriate with the deaf because of their language handicap, and the performance IQ has been used as the better indicator of what might be expected of the deaf child (Brill, 1969; Vernon, 1967). In 1974 the revised WISC (WISC-R) was published as a much improved test of intelligence. A full treatment of the WISC-R and the nature of the revision can be found in Anastasi (1976). The authors of the present research felt that the effectiveness of the WISC-R as a diagnostic assessment tool for deaf children could be greatly improved by producing a set of norms based on a representative sample of the deaf population. This would make it possible to evaluate a deaf child's performance on the WISC-R relative to his deaf and/or hearing peers. The WISC was never standardized for the deaf, and conflicting reports regarding the performance of deaf children on this intelligence test have raised many questions as to its direct application to the deaf. This research project sought to end the controversy and to improve psycho-

metric evaluations of deaf children by establishing norms for them on the five performance subtests of the WISC-R. The standardization process and the deaf norms for children between six and seventeen years of age are reported in this publication. Additional interpretative reports will follow, as time and funding permit.

DATA COLLECTION METHODS

To effect this standardization, a representative sample of congenitally deaf children was selected; the whole process of computing scaled scores and performance IQ's was carried out with data on these subjects. The objective was a sample that was large and well-balanced with respect to the background variables controlled by Wechsler in the WISC-R standardization, namely, sex, region, race, residence, and parental occupation. The investigators decided the most efficient method of obtaining a representative sample of congenitally deaf children was to concentrate testing efforts in residential schools for the deaf throughout the United States. The highest percentage of profoundly deaf children has been reported to be in residential deaf schools, whereas only a relatively low percentage has been reported enrolled in day school programs (Brill, 1971; Rawlings, 1973).

To obtain the needed data, nationally recognized residential schools for the deaf with qualified, experienced psychologists were selected. Their assistance with the data collection process was requested by Dr. William J. McClure, President of the Florida School for the Deaf and the Blind (F.S.D.B.), and Frankie H. Sisco, psychologist, F.S.D.B. A cover letter, written by Dr. McClure (Appendix 1), a prospectus of the project (Appendix 2), and a questionnaire form (Ap-

pendix 3) indicating their interest in participating in the project were sent to these schools. Twenty of the twenty-two schools agreed to participate. Later, two southern schools dropped out of the project, and this resulted in a less representative sample from the southern region than had been anticipated. The remaining eighteen residential schools which participated in the project are listed in Appendix 4.

During the spring of 1975 several day school programs for the deaf expressed an interest in participating in the project. It was decided that data from these programs should be reviewed and, if appropriate, included in the standardization sample. It was felt that the inclusion of data from day school programs would widen the application and use of the deaf norms and justify the extension of the norms to deaf children not in residential programs. Inspection of data from day school programs did not reveal any significant differences in the performance of students from the two types of programs, and therefore the four day school programs were included in the project. Their names and the name of the contact person in each school are also listed in Appendix 4.

SAMPLE CHARACTERISTICS

Data collection began in December, 1974, and was completed in June, 1976. A total of 1,228 WISC-R protocols was received, each complete with a WISC-R Record Form and Background Questionnaire (see Appendix 5). All subjects were congenitally or prelingually deaf and had a hearing loss of at least 70 dB (pure-tone average) in the better ear. Tables 1 and 2 present the characteristics of the deaf sample for comparison with the WISC-R hearing standardization sample.

The frequencies and percentages reported are fairly consistent with the 1970 national census report and with the WISC-R hearing standardization sample. Where differences occur, they are usually characteristic of this special population. For example, Rawlings (1973) reports a higher proportion of males than females among school-age deaf children, and Ries, Bateman, and Schildroth (1975) report higher rates of deafness among blacks than among whites in special educational programs throughout the United States. The deaf standardization sample may be considered, therefore, to be representative of deaf children in general throughout the United States.

Additional background information collected on the deaf standardization sample included the hearing status of the parents and the method of communication used during the testing session. Table 3 reports the hearing status of the parents; Table 4 reports the number of

TABLE 1: CHARACTERISTICS OF DEAF WISC-R SAMPLE AND WECHSLER'S WISC-R SAMPLE

	Deaf WISC-R N=1228	WISC-R N=2200
Sex		
Male	56.0%	50.0%
Female	44.0%	50.0%
Race		
White	78.1%	85.0%
Non-White	20.8%	15.0%
Unreported	1.1%	
Urban/Rural Residence		
Rural	16.4%	29.2%
Urban	82.5%	70.8%
Unreported	1.1%	
Geographic Region		
Northeast	19.9%	21.8%
North Central	33.8%	29.1%
South	20.2%	31.6%
West	24.8%	17.5%
Unreported	1.3%	
Parental Occupation		
Professional and Technical		
Workers	14.5%	15.0%
Managers, Officials, Proprietors, Clerical Workers and Sales		
Workers	18.9%	27.0%
Craftsmen and Foremen	16.7%	22.6%
Operatives, Service Workers (including private household), Farmers, and Farm Managers	29.3%	29.0%
Laborers, Farm Laborers, and Farm Foremen	12.4%	6.4%
Other ^b	8.2%	

^aThese data were obtained from the WISC-R manual (Wechsler, 1974).

^bThere were 101 deaf students whose parental occupation was listed as unemployed, on welfare, deceased, etc.

subjects tested by the various methods of communication.

The mean WISC-R performance IQ for the deaf sample was 95.7, and the standard deviation was 17.55. Wechsler's mean performance IQ score for hearing children on the WISC-R was 100, and the standard deviation was 15. The difference between the means of the deaf and hearing samples was significant beyond the .01 level ($t = 9.97$); this indicates that the performance of the deaf is significantly different from the hearing on the

TABLE 2: AGE DISTRIBUTION OF SAMPLES*

Age Group	Number of Deaf Subjects [†]	Number of Hearing Subjects
6.5	53	200
7.5	69	200
8.5	84	200
9.5	79	200
10.5	196	200
11.5	181	200
12.5	125	200
13.5	113	200
14.5	129	200
15.5	121	200
16.5	73	200

*Age groups of deaf subjects ranged across the entire calendar year. For example, the 53 subjects listed at age 6.5 ranged in age from 6-0-0 to 6-11-30. Each subject in Wechsler's sample was tested within 6 weeks of his birthday.

[†]Ages for five students were not reported.

TABLE 3: HEARING STATUS OF PARENTS

	N	%
Both Hearing	1,100	89.6
Both Deaf	100	8.1
One Hearing, One Deaf	6	0.5
Not Reported	22	1.8
TOTAL	1,228	100.0

TABLE 4: METHOD OF COMMUNICATION USED IN TEST ADMINISTRATION

	N	%
Total Communication	948	77.2
Oral Communication (Speech only)	27	2.2
Fingerspelling with Speech	54	4.4
Gestures	16	1.3
Pantomime	90	7.3
Other	81	6.6
Not Reported	12	1.0
TOTAL	1,228	100.0

performance scale of the WISC-R. A significant difference was also found between the standard deviations for the two groups ($t=5.12$, significant beyond .01 level), thus indicating more variability within the deaf sample. Examination of the data, however, does not support the conclusion that the performance of all deaf children differs significantly from hearing children on

the entire performance scale of the WISC-R (see "Findings" section). The variability within the deaf sample was not uniformly distributed across all age levels and across all levels of ability. In fact, most of the variability appeared to be concentrated in two subtests, Picture Arrangement and Coding.

Table 5 provides a comparison of the deaf subjects' performance on the WISC-R, Leiter International Performance Scale (LIPS), and Hiskey-Nebraska. The small proportion of the sample tested on the LIPS and Hiskey-Nebraska makes any conclusions tenuous.

TABLE 5: COMPARISON OF DEAF SUBJECTS' PERFORMANCE ON WISC-R, LIPS, HISKEY-NEBRASKA

	Mean Performance IQ	t	Standard Deviation	t
WISC-R N=1202	95.70	9.97*	17.55	5.12*
Leiter (LIPS) N=320	97.44	2.86*	16.90	1.42 N.S.
Hiskey-Nebraska N=219	96.78	2.97*	18.64	3.45*

*Significant beyond .01 level by comparison with original normative data.

COMPUTATION OF THE NORMS

The linear transformation procedure used in the computation of scaled scores for the WISC-R incorporates a smoothing procedure combining adjacent frequencies and using $2N$ as the denominator for converting relative cumulative frequencies to proportions, and then, by way of the q probability, to a deviation (Z) score. The resultant z scores are then multiplied by three and added to 10 to get the scaled score for the raw score in the original variable. This transformation provides scores with a re-scaled arithmetic mean of 10 and standard deviation of three, with the original distribution smoothed. The raw scores were not directly converted to z scores and then to scaled scores.

With the aid of programmers at Northeast Regional Data Center (NERDC), this same procedure was used to develop the norms for deaf children. Since the subjects in the deaf sample were considered to be reasonably representative of deaf children in programs throughout the United States, all 1,228 subjects were included in the standardization process. Subjects were grouped by birth years, and, for each age group, scaled scores were computed for every raw score on each of

the five performance subtests. Some examiners did not furnish scores on the Mazes Subtest, which is the alternate test. The data received showed little difference between the performances of deaf and hearing children (see Figure 1); therefore no new norms were computed for this subtest.

To compute scaled score tables for four-month intervals and to obtain consistency of scaled score improvement over time, the data were subjected to a statistical smoothing procedure. A similar procedure was used in the standardization of the WISC-R with hearing children. The smoothing process also eliminated the inconsistencies that result from the data on rubella children. All smoothing was done from families of graphs constructed as follows: the full range of raw scores in each of the five performance subtests was the ordinate. Age, from 6.5 to 16.5 years, was the abscissa for each subtest. Scaled scores were plotted opposite the appropriate raw scores for every age group. Then, for each of the five subtests, families of curves were drawn across the graphs, with wide bars showing the raw scores for each scaled score at every age. The midyear raw scores for given scaled scores were then read directly from the smoothed curves. Those scores for the first third and last third of each year were interpolated. For all subtests, the age groups 6 years, 0 months, 0 days to 6 years, 3 months, 30 days (at the lower end) and 16 years, 8 months, 0 days to 16 years, 11 months, 30 days (at the upper end) had to be extrapolated, since these were the end categories of the ages. The levelling off of

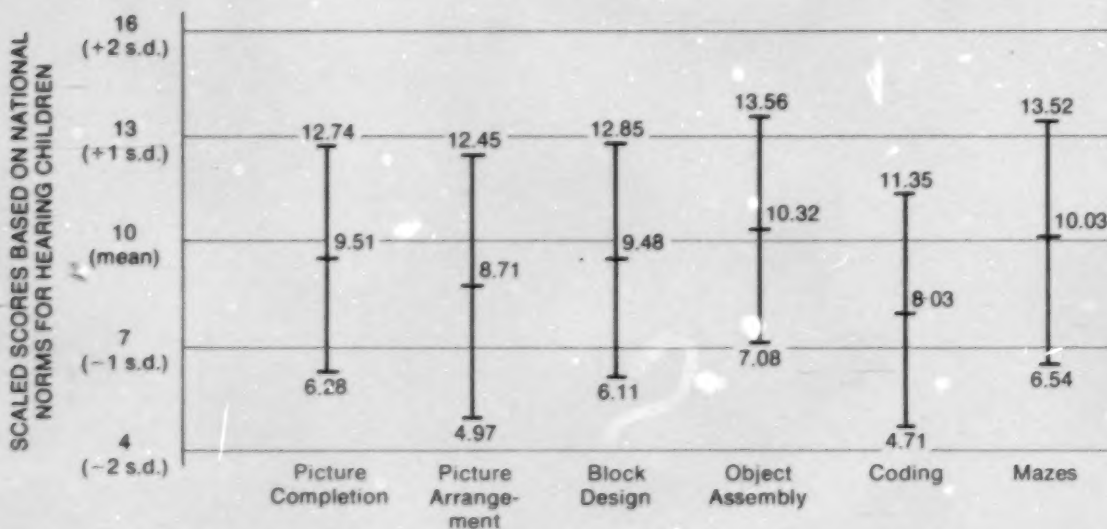
mental ability at about age 16 brought most of the curves asymptotically to a fairly horizontal level. For Coding A, the age group 7 years, 8 months, 0 days to 7 years, 11 months, 30 days and for Coding B, the age group 8 years, 0 months to 8 years, 3 months, 30 days had to be extrapolated because of the transition from Coding A to Coding B at age eight.

Once determined by these methods, the scaled scores established for all raw scores were accumulated into the appropriate age tables and cross-checked for inclusion of all raw scores and for consistency from age group to age group. Discrepancies were referred back to the graphs and reconciled. Deaf norms were then compared to the standard norms and were found to be similar.

GENERAL FINDINGS

The WISC-R norms for the deaf do not differ greatly from the WISC-R norms for the hearing. Figure 1 shows that the greatest differences in the performance of deaf children relative to their hearing peers occurred on the Coding and Picture Arrangement Subtests in which deaf children performed significantly below their hearing peers. Little difference was found between the two groups on the Picture Completion and Block Design Subtests. Deaf children performed best on the Object Assembly Subtest, and the norms for deaf children on this test were slightly higher than the norms for hearing children. Deaf children had scores similar to or

FIGURE 1: SCALED SCORE DISTRIBUTION FOR DEAF SAMPLE, BY REFERENCE TO NATIONAL NORMS FOR HEARING CHILDREN: MEAN SCALED SCORE $\pm$ ONE STANDARD DEVIATION



slightly better than hearing children on the Mazes Subtest at most age levels. In general, there were greater discrepancies in the performance of young deaf children relative to their hearing peers; some of the discrepancies dissipated with age. Bright, high-scoring deaf children tended to perform similarly to their hearing peers. More raw score variance occurred within the deaf sample at all age groupings on all subtests. No adverse time bonus effects were noted.

Table 6 presents the scaled score means and standard deviations of the deaf standardization sample; these findings are graphically represented in Figure 1.

TABLE 6: SCALED SCORE SUBTEST PATTERN FOR DEAF STANDARDIZATION SAMPLE

	Scaled Score Mean	S.D.	t*
Picture Completion	9.51	3.23	- 5.72**
Picture Arrangement	8.71	3.74	-15.07**
Block Design	9.48	3.37	- 6.07**
Object Assembly	10.32	3.24	+ 3.74**
Coding	8.03	3.32	-23.01**
Mazes	10.03	3.49	- .35 N.S.

*t calculated for significance of difference between subtest scaled score mean for deaf sample and WISC-R scaled score mean of 10.

**Significant beyond .01 level.

As previously indicated, the variability within the deaf sample was *not* uniformly distributed across all age levels and across all levels of ability. Figures 2 thru 6 show the relationships among age, raw scores, and scaled scores for deaf and hearing children at three levels of ability: below average (scaled score of 5), average (scaled score of 10), and above average (scaled score of 15). The graphs reflect the general trend of scoring patterns for the two groups, and they indicate that age and level of ability were important variables in the deaf sample. They do not, however, completely describe the combined results of the deaf sample across all age levels and across all levels of ability (scaled scores range from 1 to 19). Further statistical analysis of the data is needed to clarify intra-subtest variability within the deaf sample. The comments in the next section regarding the specific subtest findings are based upon the entire data for each subtest.

SPECIFIC SUBTEST FINDINGS

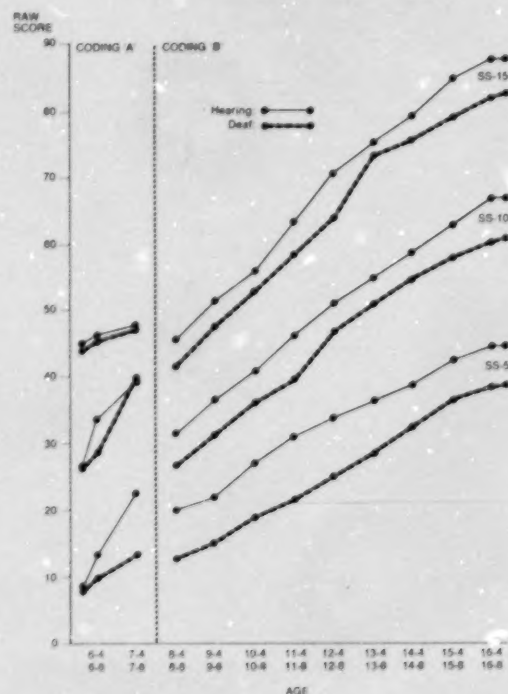
Coding A (administered to children between 6 and 8 years of age): Average and low-scoring deaf children performed significantly below their hearing peers on this subtest. In general, very high-scoring deaf children performed similarly to their hearing peers, and there

were no great discrepancies in raw score to scale score conversions (see Figure 2).

Coding B (administered to children between 8 and 17 years of age): In general, the deaf as a group scored significantly below their hearing peers on the Coding B Subtest. The greatest discrepancy occurred at age 8, the age at which Coding B is first introduced. Review of the data for the entire subtest showed this discrepancy tended to lessen with age, and after 13 or 14 years of age usually only very low-scoring deaf children (with scale scores 5 or below) showed large raw score and scaled score discrepancies. Level of ability was also an important variable; the younger, low-scoring deaf children showed the greatest discrepancy, and the older high-scoring children showed the least discrepancy (see Figure 2).

Picture Arrangement: Very low-scoring deaf children performed significantly below their hearing peers on this subtest at all age levels, and there are substantial differences between raw to scale score conversions for the two groups. Very high-scoring deaf children scored similarly to their hearing peers, and their scaled scores converged with those of hearing children at the upper

FIGURE 2: RELATIONSHIPS AMONG AGE, RAW SCORES AND SCALED SCORES OF 5, 10 AND 15 FOR DEAF AND HEARING CHILDREN ON THE CODING SUBTEST



age levels. After age 12, deaf children of average or above average ability tended to perform similarly to hearing children (see Figure 3).

Block Design: Below 8 to 9 years of age, deaf children of average or above average ability scored slightly higher than hearing children on this subtest. At higher levels of ability (scale scores 15+) the deaf continued to perform slightly better than hearing children until 12 or 13 years of age; afterwards, the scoring patterns of deaf children were similar to hearing children except at very low levels of ability (scale scores 5 and below), where the deaf performed below the hearing (see Figure 4).

Object Assembly: Deaf children generally scored slightly higher than hearing children on this subtest, but overall, there were no great differences in raw score to scale score conversions for the two groups at most age levels. Where differences occurred, higher raw scores were typically made by deaf children. Below 10 to 11 years of age, deaf children of average to moderately retarded ability scored higher than their hearing peers; afterwards, their scores tended to converge with those of hearing children (see Figure 5).

Picture Completion: There was little difference between the performance of deaf and hearing children on this subtest. Most discrepancies occurred in the young, low-scoring deaf group (see Figure 6).

FIGURE 3: RELATIONSHIPS AMONG AGE, RAW SCORES AND SCALED SCORES OF 5, 10 AND 15 FOR DEAF AND HEARING CHILDREN ON THE PICTURE ARRANGEMENT SUBTEST

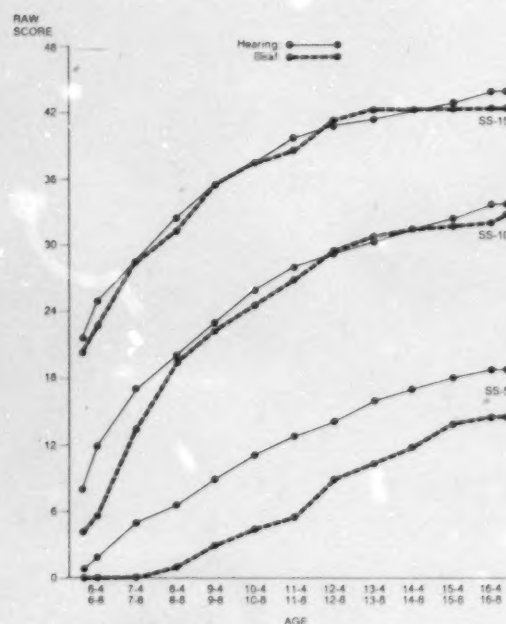
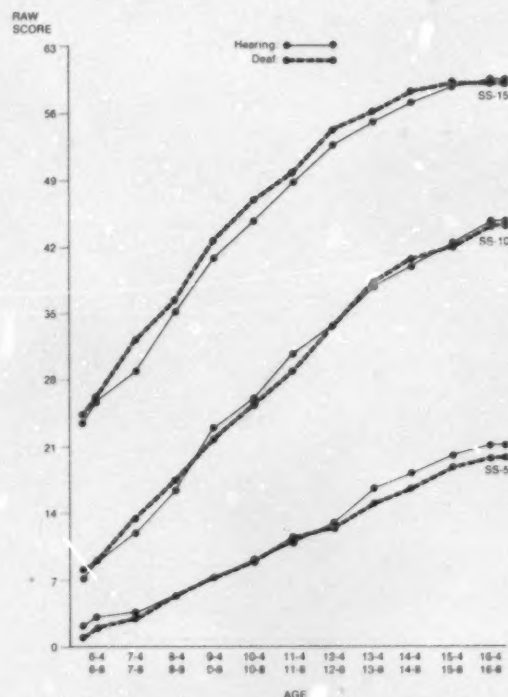


FIGURE 4: RELATIONSHIPS AMONG AGE, RAW SCORES AND SCALED SCORES OF 5, 10 AND 15 FOR DEAF AND HEARING CHILDREN ON THE BLOCK DESIGN SUBTEST



Mazes: The scoring patterns on the Mazes Subtest for the deaf and hearing children were almost identical, and no separate norms were required. Its use as an alternate subtest appeared to be highly appropriate.

SUMMARY

To improve psychometric evaluation of deaf children, the performance scale of the WISC-R was standardized on a national sample of 1,228 deaf children. Data were collected from 18 residential schools and four day schools for the deaf, located throughout the United States. The characteristics of the deaf sample were similar to those of Wechsler's WISC-R hearing sample. Information concerning the "hearing status of the parents" and the "communication method" used during testing is reported. Norms for deaf children between the ages of 6-0-0 and 16-11-30 are presented and the statistical procedures used to compute the norms described.

In general, deaf children performed similarly to hearing children on all performance subtests except Coding and Picture Arrangement; deaf children, particularly

FIGURE 5: RELATIONSHIPS AMONG AGE, RAW SCORES AND SCALED SCORES OF 5, 10 AND 15 FOR DEAF AND HEARING CHILDREN ON THE OBJECT ASSEMBLY SUBTEST

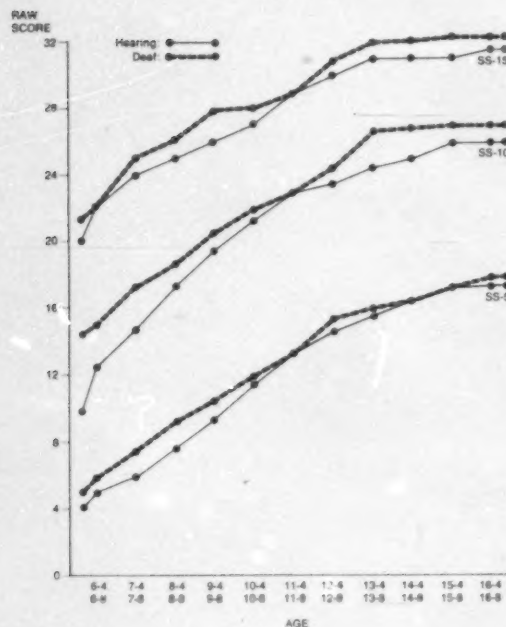
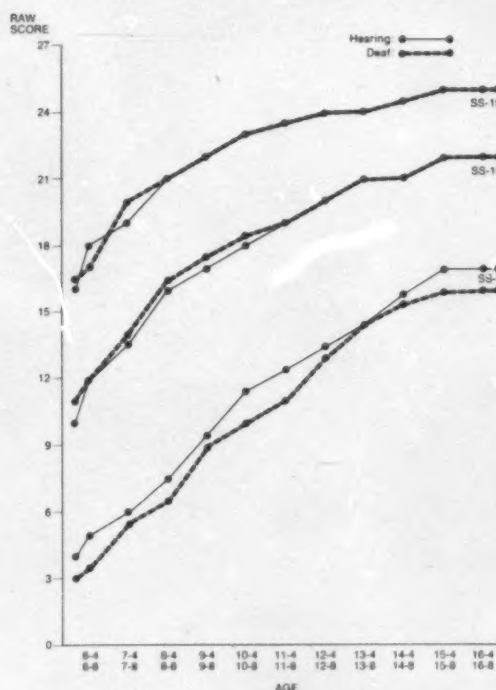


FIGURE 6: RELATIONSHIPS AMONG AGE, RAW SCORES AND SCALED SCORES OF 5, 10 AND 15 FOR DEAF AND HEARING CHILDREN ON THE PICTURE COMPLETION SUBTEST



young, low-scoring deaf children, performed significantly below their hearing peers on these subtests. More raw score variance occurred within the deaf sample at all age groupings and on all subtests. Significant differences (beyond the .01 level) between the two groups were also found in the subtest scaled score patterns, the mean performance IQ scores, and the standard deviations.

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APPENDIX 1
Invitational Letter to Schools

The Florida School

for the

Deaf and the Blind



WILLIAM J. MCCLURE
PRESIDENT

POST OFFICE BOX 1209
ST. AUGUSTINE, FLORIDA 32084
904-624-1664

December 2, 1974

Our Child Study Center feels that the new WISC-R is a much improved test for deaf children and, like its predecessor, is quite likely to be the most widely used test of mental ability with deaf children for some time to come. This new version would be much more effective if there were standardized norms for our specific population in schools for the deaf. Mrs. Frankie Sisco, a psychologist in our Child Study Center, together with Dr. Richard J. Anderson, of the Psychology Department at the University of Florida, is developing plans to establish norms for the WISC-R which have been standardized on a deaf population.

To aid in securing the data upon which norms can be standardized, we are asking 15 - 20 schools for the deaf with recognized professional stature if they would assist in this project. More complete information is contained in the enclosure. We hope that after studying it you will be willing to lend your assistance.

Please let us hear from you.

Sincerely,

William J. McClure
President

WJM:a

Enclosures

APPENDIX 2

Prospectus of Project

November 25, 1974

TO: The Administrators and Psychological Staffs of Selected Institutes for the Deaf

FROM: The Florida School for the Deaf and the Blind in Cooperation with the Department of Psychology, University of Florida

RE: Project to Re-standardize the WISC-R for the Deaf

In continuing attempts to provide better and more effective services to the deaf child, improved psychological evaluation and more appropriate personal and educational planning based on psychological assessment offer much promise. The Wechsler Intelligence Scale for Children (WISC), since its inception in 1949, has been overwhelmingly the most widely used test of mental ability with the deaf, as with hearing children (Levine, E., *Volta Review*, May, 1974). However, the Verbal IQ, and the subtests upon which it is based, have often proven inappropriate, and typically the Performance IQ has been used as the better indicator of what might be expected of the deaf child. Now that the revised WISC-R has just been published as a much improved test there is a timely opportunity to make the use of this new version more effective by producing standardized norms for our specific population. No such precise modification of the WISC was validated, and speculation and opinion during 25 years have raised some questions with regard to its facile application to the deaf.

To effect this standardization, a representative sample of institutionalized congenitally deaf children, from 6-0-0 to 16-11-30 in age, must be obtained and the whole process of computing scaled scores and Performance IQ's carried out with data from these subjects. Comparison of deaf and hearing norms should provide interesting insights into the dimensions of the tested differences. The sample for standardization must not only be large; it must also be balanced with respect to sex, region, race, parental occupation, the background variables controlled by Wechsler in the original standardization. It must avoid known biasing complications such as the recurrent flare-up of rubella as a confounding factor with the deaf. Therefore, we need to enlist the cooperation of 12-20 sources of subjects.

Institutions with the psychological staffs and resources to do the testing as a part of the continuing program of evaluation of their own clientele are being asked to arrange their schedules of testing so that this project can obtain the data needed. Assistance from schools would involve primarily administering tests, as their schedules allowed during the next 12 months, and completing a very simple questionnaire regarding the subject and testing situation.

The cover letter with this prospectus from President William J. McClure of the Florida School for the Deaf and the Blind solicits your participation in this effort. The Division of Sponsored Research at the University of Florida will also aid, and the North Florida Data Processing Center will be involved in the analysis of the data. Psychologist Frankie J. H. Sisco of the Child Study Center at the St. Augustine D & B School will be Director of the testing in that institution and will coordinate testing with other institutions. In addition to testing and psychological evaluation experience with the deaf, she has had extensive experience testing and working with institutionalized retarded children. Directing technical psychometric phases will be Richard J. Anderson, Ph.D., Professor of Psychology, University of Florida. He has administered large scale testing programs at the University of Michigan and at Florida and constructed the first Drivers License Examinations for the Florida Department of Public Safety and the Highway

Patrol. More detailed explanations will be furnished to all interested institutions, but if you wish to direct any questions to any of the three persons named as sources of information please do so.

All schools participating in this research project will receive recognition for their contributions and will receive reprints of published articles. The success of any project of this magnitude depends upon the assistance and cooperation of professionals who recognize the need. In the hope that you can and will join us in this study a form for your reply is enclosed.

APPENDIX 3
Questionnaire to Schools
Project to Re-Standardize the WISC-R for the Deaf

Institution invited to participate:

Name: _____

Address: _____

Will your institution assist in the collection of data on the WISC-R?

_____ yes _____ no

Approximately how many congenitally or prelingually deaf children are there in your school?

_____ male _____ female

How many do you expect to test routinely on the WISC-R during the next 12 months?

How many could you test if we supplied the materials?

Is it possible to furnish us with the subjects' WISC-R Record Forms?

_____ yes _____ no

Must the Record Forms be returned after use here?

_____ yes _____ no

Please send this reply to:

Frankie H. Sisco
Child Study Center
The Florida School for the Deaf and the Blind
P.O. Box 1209
St. Augustine, Florida 32084

APPENDIX 4

Schools Participating in Project

Residential

Mrs. Lynn Cameron, Psychologist
American School for the Deaf
139 N. Main St.
West Hartford, Connecticut 06107

Mr. G. Leon Curtis
Arizona State School for the Deaf and the Blind
P.O. Box 5545
Tucson, Arizona 85703

Mrs. Margaret Eaton
California School for the Deaf
3044 Horace Street
Riverside, California 92506

Mrs. Jean Prince
School Psychologist
California School for the Deaf
2601 Warring Street
Berkeley, California 94704

Mrs. Frankie Sisco, Psychologist
Florida School for the Deaf and the Blind
Post Office Box 1209
St. Augustine, Florida 32084

Mrs. Dorothy F. Kaufmann
Director of Educational Clinical Services
Illinois School for the Deaf
125 Webster
Jacksonville, Illinois 62650

Ms. Susan W. Shults
School Psychologist
Indiana School for the Deaf
1200 East 42nd St.
Indianapolis, Indiana 46205

Mr. J. Day
Office of the Los Angeles County Superintendent of
Schools
Division of Special Education
9300 E. Imperial Highway
Downey, California 90242

Mr. Gary Krapf, Psychologist
Marie H. Katzenbach School for the Deaf
Sullivan Way
West Trenton, New Jersey 08625

Mr. Brian F. Alles, Psychologist
Maryland School for the Deaf
Columbia Campus
Post Office Box 894
Columbia, Maryland 21044

Mr. William A. Sherman, Psychologist
Maryland School for the Deaf
Frederick, Maryland 21701

Mr. Ernest E. Haecker, Director
Hearing Test and Child Study Center
New Mexico School for the Deaf
1060 Cerrillos Road
Santa Fe, New Mexico 87501

Dr. Rudolph Caicedo
School Psychologist
New York School for the Deaf
555 Knollwood Road
White Plains, New York 10603

Mr. Dennis Wean, Director
Evaluation and Guidance Services
North Carolina Schools for the Deaf
Highway 64
Morganton, North Carolina 28655

Ms. Michelle Boyer, Psychologist
Rochester School for the Deaf
1545 St. Paul Street
Rochester, New York 14621

Mr. David A. Stansberry
School Psychologist
St. Mary's School for the Deaf
2253 Main Street
Buffalo, New York 14214

Mr. Larry Porter, Psychologist
South Carolina School for the Deaf and the Blind
Cedar Spring Station
Spartanburg, South Carolina 29302

Mrs. Evelyn Gant
School Psychologist and
Director of Pupil Services
Wisconsin School for the Deaf
309 West Walworth Avenue
Delavan, Wisconsin 53115

Day

Ms. Audrey Simmons-Stevens, Psychologist
Central Institute for the Deaf
818 South Euclid
St. Louis, Missouri 63110

Ms. Caroline Mitchell
Callier School for the Deaf
1966 Inwood Road
Dallas, Texas 75235

Ms. Franziska Naughton
School Psychologist
South Metropolitan Association
250 W. Sibley Boulevard
Dolton, Illinois
P.O. Harvey, Illinois 60426

Ms. Barbara J. Rossier, Psychologist
Taft Aurally Handicapped Program
500 West Keller Street
Santa Ana, California 92707

APPENDIX 5

WISC-R Background Questionnaire

Project to Re-standardize the WISC-R for the Deaf

NAME: _____ DATE TESTED: _____ Year Month Day
SEX: _____ MALE _____ FEMALE _____ DATE OF BIRTH: _____
RACE: _____ WHITE _____ NONWHITE _____ AGE: _____
SCHOOL: _____ TITLE: _____
EXAMINER: _____

Please check one in each of the following categories (A thru D):

A. Occupation of Head of Household:

- _____ 1) Professional and technical workers
_____ 2) Managers, officials, proprietors, clerical workers and sales workers
_____ 3) Craftsmen and foremen
_____ 4) Operatives, service workers (including private household), farmers, and farm managers
_____ 5) Laborers, farm laborers, and farm foremen

B. Area of Residence: _____ Urban _____ Rural

(Communities with 2500 or more inhabitants are defined as Urban and smaller communities as Rural)

C. Hearing Status of Parents: _____ Hearing _____ Deaf

D. Communication method used in the testing situation:

- _____ 1) Total Communication
_____ 2) Oral Communication (speech only)
_____ 3) Fingerspelling with speech
_____ 4) Writing
_____ 5) Gestures
_____ 6) Pantomime
_____ 7) Other, specify, if possible _____

Please provide the following psychometric data when available:

WISC Performance IQ _____ Date Adm: _____
Leiter International Performance Scale IQ _____ Date Adm: _____
Hiskey-Nebraska Learning Aptitude Test IQ _____ Date Adm: _____

Examiner comments on back, please.

Return this form to: Mrs. Frankie Sisco
FSDB, P.O. Box 1209
St. Augustine, Florida 32084

APPENDIX 6

Normative Tables for Deaf Children

NORMATIVE TABLES

The following tables present the normative data for deaf children. From the tables it can be seen that these norms are very similar to the published norms for hearing children in the WISC-R Manual. This offers both reassurance that the deaf do not differ greatly from hearing children on the WISC-R performance subtests and that the test is not inappropriately applied to the deaf even without the sophistication of these norms.

In using the tables it is suggested that the WISC-R Record Form and Profile be used in the conventional way. Then, in contrasting color, on a fixed coded basis,

the scaled scores for the deaf and the P.I.Q. from the Manual table for the sum of the scaled scores be recorded in the next column. The Profile should also be completed by adding the scaled scores for deaf students in the contrasting color for easier comparison. The table in the WISC-R Manual (page 151) for converting sum of scaled scores into performance IQ scores for hearing children should be used in the same manner to convert sum of scaled scores for deaf children into performance IQ scores. (A copy of this table also appears in Appendix 7.)

AGE: 6-0-0 to 6-3-30

Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	—	—	—	0-1	0
2	0	—	—	2	1-2
3	1	—	0	3	3-4
4	2	—	—	4-5	5-6
5	3	0	1	6	7-9
6	4-5	—	2	7-8	10-12
7	6-7	—	3	9-10	13-15
8	8-9	1	4-5	11	16-19
9	10	2	6	12-13	20-23
10	11	3-5	7-9	14-15	24-28
11	12	6-8	10-12	16	29-33
12	13	9-13	13-17	17	34-38
13	14	14-17	18-19	18-19	39-40
14	15	18-19	20-22	20	41-42
15	16-17	20-21	23-26	21-22	43-44
16	18	22-23	27-29	23	45
17	19	24-25	30-32	24-25	46
18	20-21	26-28	33-37	26-27	47
19	22-26	29-48	38-62	28-33	48-50

AGE: 6-4-0 to 6-7-30

Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	—	—	—	0-1	0
2	0	—	—	2	1-2
3	1	—	0	3	3-5
4	2	0	1	4-5	6-8
5	3-4	—	2	6	9-10
6	5-6	—	3	7-8	11-14
7	7-8	1	4	9-10	15-17
8	9-10	2	5-6	11-12	18-20
9	11	3	7	13-14	21-25
10	12	4-7	8-10	15	26-30
11	13	8-11	11-13	16	31-35
12	14	12-15	14-17	17-18	36-39
13	15	16-19	18-20	19	40-42
14	16	20-21	21-23	20-21	43
15	17	22	24-28	22	44-45
16	18	23-24	29-31	23	46
17	19-20	25-27	32-34	24-25	47
18	21	28-30	35-38	26-27	48
19	22-26	31-48	39-62	28-33	49-50

AGE: 6-8-0 to 6-11-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	—	—	—	0-2	0
2	0	—	—	3	1-3
3	1-2	—	0	4	4-6
4	3	0	1	5-6	7-9
5	4	—	2	7	10-12
6	5-6	—	3	8-9	13-15
7	7-8	1	4-5	10-11	16-18
8	9-10	2-3	6-7	12-13	19-23
9	11-12	4-7	8	14-15	24-27
10	13	8-10	9-12	16	28-32
11	14	11-14	13-15	17	33-37
12	15	15-17	16-19	18-19	38-41
13	16	18-21	20-22	20-21	42-43
14	17	22-23	23-26	22	44
15	18	24-25	27-29	23	45-46
16	19	26-27	30-32	24	47
17	20	28-29	33-36	25-26	48
18	21-22	30-31	37-41	27-28	49
19	23-26	32-48	42-62	29-33	50

AGE: 7-4-0 to 7-7-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-1	—	—	0-2	0-2
2	2	—	0	3	3-4
3	3	—	1	4	5-7
4	4	0	2	5-6	8-10
5	5-6	—	3	7-8	11-15
6	7-8	1	4-5	9-10	16-21
7	9-10	2	6	11-12	22-24
8	11-12	3-6	7-9	13-14	25-29
9	13	7-11	10-11	15-16	30-33
10	14	12-15	12-15	17-18	34-38
11	15	16-18	16-18	19	39-41
12	16	19-22	19-21	20-21	42-44
13	17-18	23-25	22-27	22	45
14	19	26-27	28-30	23-24	46
15	20	28-29	31-33	25	47
16	21	30-31	34-36	26	48
17	22	32-33	37-40	27-28	49
18	23	34-35	41-44	29	—
19	24-26	36-48	45-62	30-33	50

AGE: 7-0-0 to 7-3-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	—	—	—	0-2	0-1
2	0	—	0	3	2-4
3	1-2	—	1	4	5-7
4	3	0	2	5-6	8-10
5	4-5	—	3	7-8	11-13
6	6-7	—	4	9-10	14-17
7	8-9	1	5-6	11	18-20
8	10-11	2-4	7-8	12-13	21-25
9	12	5-9	9-10	14-15	26-29
10	13-14	10-13	11-14	16-17	30-35
11	15	14-16	15-17	18	36-39
12	16	17-19	18-20	19-20	40-42
13	17	20-23	21-24	21	43-44
14	18	24-25	25-28	22-23	45
15	19	26-27	29-31	24	46
16	20	28-29	32-34	25	47
17	21	30-31	35-38	26-27	48
18	22	32-33	39-42	28-29	49
19	23-26	34-48	43-62	30-33	50

AGE: 7-8-0 to 7-11-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-1	—	—	0-2	0-3
2	2	—	0	3-4	4-5
3	3	—	1	5	6-8
4	4	0	2-3	6-7	9-12
5	5-6	—	4	8-9	13-18
6	7-8	1	5-6	10-11	19-22
7	9-11	2-3	7-8	12-13	23-26
8	12	4-8	9-11	14-15	27-30
9	13-14	9-13	12-13	16-17	31-34
10	15	14-17	14-16	18	35-39
11	16	18-20	17-19	19-20	40-43
12	17	21-23	20-23	21-22	44-45
13	18	24-26	24-28	23	46
14	19	27-28	29-32	24	47
15	20	29-30	33-35	25	48
16	21	31-32	36-38	26	49
17	22	33-34	39-42	27-28	—
18	23	35-36	43-46	29	50
19	24-26	37-48	47-62	30-33	—

AGE: 8-0-0 to 8-3-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0	—	0	0-3	0
2	1-2	—	1	4	1
3	3-4	—	2	5	2-5
4	5	0	3	6-7	6-10
5	8-7	1	4-5	8-9	11-13
6	8-9	2	6-7	10-11	14-16
7	10-11	3-4	8-9	12-13	17-18
8	12-13	5-9	10-12	14-15	19-20
9	14-15	10-15	13-14	16-17	21-22
10	16	16-19	15-18	18-19	23-26
11	17	20-22	19-20	20	27-29
12	18	23-25	21-25	21-22	30-32
13	19	26-27	26-29	23	33-35
14	20	28-29	30-33	24-25	36-38
15	21	30-31	34-37	26	39-41
16	22	32-33	38-40	27	42-44
17	—	34-36	41-44	28-29	45-48
18	23	37-38	45-48	30-31	49-53
19	24-26	39-48	49-62	32-33	54-93

AGE: 8-8-0 to 8-11-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-1	—	0	0-4	0-1
2	2-3	—	1	5	2-3
3	4-5	0	2	6	4-7
4	6	—	3-4	7-8	8-11
5	7-8	1-2	5-6	9-10	12-14
6	9-10	3-4	7-9	11-12	15-18
7	11-13	5-7	10-12	13-14	19-20
8	14	8-12	13-14	15-16	21-23
9	15-16	13-18	15-17	17-18	24-25
10	17	19-21	18-21	19-20	26-29
11	18	22-25	22-24	21-22	30-31
12	19	26-27	25-28	23	32-35
13	20	28-29	29-32	24-25	36-39
14	21	30-31	33-37	26	40-42
15	—	32-33	38-40	27	43-44
16	22	34-35	41-44	28	45-47
17	23	36-38	45-47	29-30	48-52
18	24	39-41	48-51	31	53-57
19	25-26	42-48	52-62	32-33	58-93

AGE: 8-4-0 to 8-7-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-1	—	0	0-3	0
2	2	—	1	4	1-2
3	3-4	—	2	5-6	3-6
4	5	0	3-4	7-8	7-10
5	6-7	1	5	9-10	11-14
6	8-10	2-3	6-8	11-12	15-17
7	11-12	4-6	9-10	13-14	18-19
8	13	7-11	11-13	15	20-22
9	14-15	12-17	14-15	16-17	23-24
10	16-17	18-21	16-19	18-19	25-28
11	18	22-24	20-22	20-21	29-30
12	19	25-26	23-26	22	31-33
13	20	27-28	27-30	23-24	34-36
14	21	29-30	31-34	25	37-39
15	—	31-32	35-38	26	40-42
16	22	33-34	39-42	27	43-46
17	23	35-38	43-45	28-29	47-50
18	24	39-40	46-49	30-31	51-54
19	25-26	41-48	50-62	32-33	55-93

AGE: 9-0-0 to 9-3-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-1	—	0	0-4	0-1
2	2-3	0	1-2	5	2-4
3	4-5	—	3	6-7	5-8
4	6	1	4-5	8-9	9-12
5	7-9	2-3	6-7	10-11	13-15
6	10-11	4-5	8-10	12-13	16-20
7	12-13	6-9	11-13	14-15	21-22
8	14-15	10-14	14-15	16-17	23-25
9	16	15-19	16-18	18-19	26-27
10	17-18	20-23	19-23	20	28-30
11	19	24-26	24-26	21-22	31-33
12	20	27-28	27-30	23-24	34-37
13	21	29-30	31-34	25	38-41
14	—	31-32	35-39	26	42-44
15	22	33-34	40-42	27-28	45-46
16	23	35-36	43-46	29	47-49
17	—	37-39	47-49	30	50-54
18	24	40-42	50-53	31-32	55-59
19	25-26	43-48	54-62	33	60-93

AGE: 9-4-0 to 9-7-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-2	—	0-1	0-4	0-1
2	3	0	2	5	2-5
3	4-5	—	3-4	6-7	6-8
4	6-7	1	5-6	8-9	9-13
5	8-10	2-4	7-8	10-11	14-17
6	11-12	5-6	9-11	12-14	18-21
7	13-14	7-10	12-14	15-16	22-24
8	15	11-15	15-16	17-18	25-26
9	16	16-20	17-19	19	27-29
10	17-18	21-24	20-24	20-21	30-32
11	19	25-27	25-27	22-23	33-35
12	20	28-29	28-32	24	36-38
13	21	30-32	33-37	25-26	39-43
14	—	33-34	38-41	27	44-46
15	22	35-36	42-44	28	47-48
16	23	37-38	45-48	29	49-51
17	24	39-41	49-51	30	52-57
18	25	42-43	52-54	31-32	58-61
19	26	44-48	55-62	33	62-93

AGE: 10-0-0 to 10-3-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-3	0	0-1	0-5	0-3
2	4	—	2-3	6-7	4-6
3	5-6	—	4-5	8	7-10
4	7-8	1-2	6-7	9-10	11-15
5	9-11	3-6	8-10	11-12	16-19
6	12-13	7-8	11-12	13-14	20-24
7	14-15	9-12	13-15	15-16	25-26
8	16	13-17	16-19	17-18	27-29
9	17	18-22	20-22	19-20	30-32
10	18-19	23-25	23-27	21-22	33-35
11	20	26-29	28-31	23-24	36-37
12	21	30-31	32-35	25	38-41
13	22	32-33	36-39	26	42-46
14	—	34-35	40-44	27	47-50
15	—	36-37	45-47	28	51-52
16	23	38-39	48-50	29-30	53-55
17	24	40-42	51-53	31	56-60
18	25	43-45	54-57	32	61-85
19	26	46-48	58-62	33	66-93

AGE: 9-8-0 to 9-11-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-2	—	0-1	0-4	0-1
2	3-4	0	2-3	5-6	2-6
3	5-6	—	4	7	7-9
4	7	1-2	5-6	8-9	10-14
5	8-10	3-5	7-9	10-11	15-18
6	11-12	6-7	10-12	12-14	19-23
7	13-14	8-11	13-14	15-16	24-25
8	15	12-16	15-18	17-18	26-27
9	16-17	17-21	19-21	19-20	28-30
10	18	22-24	22-26	21	31-34
11	19	25-28	27-30	22-23	35-36
12	20	29-30	31-34	24-25	37-40
13	21	31-32	35-38	26	41-44
14	22	33-34	39-43	27	45-48
15	—	35-36	44-46	28	49-51
16	23	37-38	47-49	29	52-53
17	24	39-41	50-52	30	54-58
18	25	42-44	53-56	31-32	59-63
19	26	45-48	57-62	33	64-93

AGE: 10-4-0 to 10-7-30
Performance

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-3	0	0-2	0-5	0-4
2	4-5	—	3-4	6-7	5-6
3	6-7	—	5	8	7-10
4	8	1-2	6-7	9-10	11-16
5	9-11	3-6	8-10	11-13	17-21
6	12-13	7-8	11-13	14-15	22-24
7	14-15	9-14	14-16	16-17	25-27
8	16	15-18	17-19	18-19	28-30
9	17	19-22	20-23	20-21	31-34
10	18-19	23-26	24-28	22	35-37
11	20	27-29	29-32	23-24	38-39
12	21	30-31	33-36	25	40-42
13	22	32-33	37-40	26	43-47
14	—	34-36	41-45	27	48-51
15	23	37-38	46-48	28	52-53
16	—	39-40	49-52	29-30	54-57
17	24	41-43	53-54	31	58-63
18	25	44-45	55-58	32	64-67
19	26	46-48	59-62	33	68-93

AGE: 10-8-0 to 10-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-4	0	0-2	0-6	0-5
2	5	—	3-4	7	6-9
3	6-7	—	5	8	10-12
4	8-9	1-2	6-8	9-11	13-17
5	10-11	3-6	9-11	12-13	18-22
6	12-13	7-10	12-14	14-16	23-26
7	14-15	11-14	15-17	17-18	27-29
8	16	15-19	18-20	19	30-32
9	17	20-23	21-24	20-21	33-35
10	18-19	24-26	25-29	22	36-38
11	20	27-29	30-33	23-24	39-41
12	21	30-31	34-37	25-26	42-44
13	22	32-34	38-41	27	45-49
14	—	35-36	42-46	28	50-54
15	23	37-38	47-49	29	55-56
16	—	39-40	50-53	30	57-58
17	24	41-44	54-55	31	59-64
18	25	45	56-59	32	65-68
19	26	46-48	60-62	33	69-93

AGE: 11-4-0 to 11-7-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-4	0	0-2	0-6	0-7
2	5	—	3-4	7-8	8-12
3	6-8	1	5	9-10	13-15
4	9	2-3	6-9	11-12	16-18
5	10-12	4-7	10-13	13-14	19-24
6	13-14	8-11	14-15	15-16	25-27
7	15-16	12-17	16-19	17-18	28-31
8	17	18-20	20-22	19-20	32-34
9	18	21-25	23-26	21-22	35-37
10	19	26-28	27-31	23	38-41
11	20	29-30	32-35	24-25	42-44
12	21	31-33	36-40	26	45-47
13	22	34-35	41-44	27	48-52
14	23	36-37	45-48	28	53-57
15	—	38-39	49-51	29	58-59
16	24	40-41	52-54	30	60-61
17	25	42-44	55-57	31	62-67
18	—	45	58-60	32	68-71
19	26	46-48	61-62	33	72-93

AGE: 11-0-0 to 11-3-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-4	0	0-2	0-6	0-6
2	5	—	3-4	7	7-10
3	6-8	1	5	8-9	11-13
4	9	2-3	6-8	10-12	14-18
5	10-12	4-7	9-12	13-14	19-24
6	13-14	8-11	13-14	15-16	25-27
7	15-16	12-15	15-18	17-18	28-30
8	17	16-20	19-21	19-20	31-33
9	18	21-24	22-25	21-22	34-36
10	19	25-27	26-30	23	37-39
11	20	28-30	31-34	24-25	40-42
12	21	31-32	35-39	26	43-45
13	22	33-34	40-43	27	46-50
14	23	35-37	44-47	28	51-55
15	—	38-39	48-50	29	56-57
16	24	40-41	51-54	30	58-59
17	—	42-44	55-56	31	60-65
18	25	45	57-60	32	66-69
19	26	46-48	61-62	33	70-93

AGE: 11-8-0 to 11-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-5	0	0-3	0-7	0-8
2	6	—	4	8	9-13
3	7-9	1	5	9-10	14-16
4	10	2-4	6-9	11-12	17-19
5	11-12	5-9	10-13	13-15	20-26
6	13-14	10-13	14-16	16-17	27-29
7	15-16	14-18	17-19	18-19	30-32
8	17	19-22	20-23	20-21	33-36
9	18	23-26	24-27	22	37-40
10	19-20	27-29	28-33	23-24	41-43
11	21	30-31	34-37	25	44-45
12	—	32-33	38-42	26-27	46-49
13	22	34-35	43-46	28	50-53
14	23	36-38	47-50	29	54-58
15	—	39-40	51-53	30	59-61
16	24	41-42	54-55	—	62-63
17	25	43-44	56-58	31	64-68
18	—	45	59-61	32	69-72
19	26	46-48	62	33	73-93

AGE: 12-0-0 to 12-3-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-5	0	0-3	0-7	0-9
2	6-7	1	4-5	8-9	10-14
3	8-9	2	6-7	10-11	15-17
4	10-11	3-4	8-10	12-13	18-21
5	12-13	5-10	11-14	14-15	22-27
6	14-15	11-14	15-17	16-17	28-30
7	16-17	15-20	18-20	18-19	31-34
8	18	21-23	21-24	20-21	35-37
9	19	24-26	25-28	22-23	38-41
10	20	27-30	29-34	24	42-45
11	21	31-32	35-38	25-26	46-48
12	22	33-34	39-44	27	49-51
13	—	35-37	45-48	28	52-55
14	23	38-39	49-52	29	56-60
15	24	40-41	53-54	30	61-62
16	—	42-43	55-56	31	63-65
17	25	44-45	57-59	32	66-69
18	—	46-47	60-61	—	70-74
19	26	48	62	33	75-93

AGE: 12-8-0 to 12-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-6	0	0-3	0-7	0-11
2	7-8	1	4-5	8-9	12-16
3	9-10	2	6-7	10-11	17-18
4	11-12	3-5	8-10	12-13	19-23
5	13-14	6-13	11-15	14-16	24-30
6	15-16	14-16	16-18	17-18	31-33
7	17	17-22	19-23	19-20	34-36
8	18	23-25	24-28	21-22	37-41
9	19	26-28	29-31	23-24	42-45
10	20	29-31	32-37	25	46-49
11	21	32-33	38-42	26	50-52
12	22	34-35	43-47	27-28	53-56
13	23	36-38	48-51	29	57-60
14	—	39-40	52-54	30	61-64
15	24	41-42	55-56	31	65-66
16	—	43-44	57-58	32	67-69
17	25	45-46	59-60	—	70-71
18	—	47	61	—	72-76
19	26	48	62	33	77-93

AGE: 12-4-0 to 12-7-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-5	0	0-3	0-7	0-10
2	6-7	1	4-5	8-9	11-15
3	8-10	2	6-7	10-11	16-18
4	11-12	3-5	8-10	12-13	19-22
5	13	6-12	11-14	14-16	23-27
6	14-15	13-15	15-18	17-18	28-30
7	16-17	16-21	19-22	19-20	31-35
8	18	22-24	23-26	21-22	36-39
9	19	25-27	27-31	23	40-44
10	20	28-31	32-36	24-25	45-48
11	21	32-33	37-40	26	49-50
12	22	34-35	41-45	27	51-55
13	—	36-38	46-49	28	56-58
14	23	39-40	50-53	29	59-62
15	24	41-42	54-55	30	63-64
16	—	43-44	56-57	31	65-68
17	25	45-46	58-60	32	69-71
18	—	47	61	—	72-75
19	26	48	62	33	76-93

AGE: 13-0-0 to 13-3-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-7	0	0-4	0-8	0-12
2	8	1	5-6	9-10	13-17
3	9-11	2	7-8	11-12	18-19
4	12-13	3-6	9-11	13-14	20-24
5	14	7-13	12-16	15-17	25-31
6	15-16	14-18	17-19	18-19	32-34
7	17	19-23	20-24	20-21	35-37
8	18	24-26	25-29	22	38-42
9	19	27-28	30-33	23-24	43-46
10	20-21	29-32	34-39	25-26	47-51
11	—	33-34	40-44	27	52-54
12	22	35-36	45-49	28	55-58
13	23	37-39	50-52	29	59-62
14	24	40-41	53-55	30	63-66
15	—	42-43	56	31	67-68
16	—	44	57-58	32	69-71
17	25	45-46	59-60	—	72-74
18	26	47	61	—	75-78
19	—	48	62	33	79-93

AGE: 13-4-0 to 13-7-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-8	0	0-4	0-8	0-13
2	9	1	5-7	9-10	14-17
3	10-11	2-3	8-9	11-12	18-21
4	12-13	4-6	10-12	13-14	22-25
5	14-15	7-14	13-17	15-17	26-31
6	16	15-18	18-20	18-19	32-35
7	17-18	19-24	21-25	20-21	36-39
8	19	25-26	26-30	22-23	40-43
9	20	27-29	31-35	24-25	44-48
10	21	30-32	36-41	26-27	49-52
11	22	33-34	42-45	28	53-56
12	23	35-36	46-49	29	57-60
13	—	37-39	50-52	30	61-65
14	24	40-41	53-55	31	66-68
15	—	42-43	56-57	32	69-70
16	25	44	58-59	—	71-72
17	—	45-46	60	—	73-76
18	26	47	61	—	77-80
19	—	48	62	33	81-93

AGE: 14-0-0 to 14-3-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-8	0	0-4	0-9	0-15
2	9-10	1	5-7	10-11	16-19
3	11-12	2-3	8-10	12-13	20-22
4	13-14	4-6	11-13	14-15	23-28
5	15	7-15	14-18	16-17	29-34
6	16-17	16-20	19-21	18-19	35-38
7	18	21-25	22-27	20-22	39-41
8	19	26-27	28-33	23-24	42-46
9	20	28-30	34-38	25	47-51
10	21	31-32	39-43	26-27	52-55
11	22	33-34	44-47	28	56-60
12	23	35-36	48-51	29	61-63
13	—	37-39	52-54	30	64-68
14	24	40-41	55-56	31	69-71
15	—	42-43	57-58	32	72-73
16	25	44	59-60	—	74-75
17	—	45-46	61	—	76-79
18	26	47	62	33	80-84
19	—	48	—	—	85-93

AGE: 13-8-0 to 13-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-8	0	0-4	0-9	0-14
2	9	1	5-7	10-11	15-18
3	10-12	2-3	8-9	12-13	19-21
4	13-14	4-6	10-13	14-15	22-27
5	15	7-15	14-18	16-17	28-33
6	16	16-18	19-21	18-19	34-37
7	17-18	19-24	22-26	20-21	38-40
8	19	25-26	27-32	22-23	41-45
9	20	27-29	33-37	24-25	46-50
10	21	30-32	38-41	26-27	51-53
11	22	33-34	42-46	28	54-58
12	23	35-36	47-50	29	59-62
13	—	37-39	51-53	30	63-66
14	24	40-41	54-56	31	67-70
15	—	42-43	57-58	32	71-72
16	25	44	59	—	73-74
17	—	45-46	60	—	75-78
18	26	47	61	—	79-82
19	—	48	62	33	83-93

AGE: 14-4-0 to 14-7-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-9	0	0-4	0-9	0-15
2	10-11	1	5-7	10-11	16-21
3	12-13	2-3	8-10	12-13	22-24
4	14	4-7	11-13	14-15	25-29
5	15-16	8-16	14-19	16-17	30-35
6	17	17-21	20-22	18-19	36-39
7	18	22-25	23-29	20-22	40-43
8	19	26-27	30-34	23-24	44-48
9	20	28-30	35-39	25	49-52
10	21	31-32	40-43	26-27	53-57
11	22	33-34	44-47	28	58-62
12	23	35-36	48-51	29	63-65
13	—	37-39	52-54	30	66-70
14	24	40-41	55-57	31	71-73
15	—	42-43	58-59	32	74-75
16	25	44	60	—	76-77
17	—	45-46	61	—	78-82
18	26	47	62	33	83-85
19	—	48	—	—	86-93

AGE: 14-8-0 to 14-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-9	0	0-4	0-10	0-16
2	10-11	1	5-8	11-12	17-21
3	12-13	2-3	9-10	13	22-25
4	14-15	4-7	11-14	14-16	26-31
5	16	8-16	15-19	17-18	32-36
6	17	17-21	20-23	19-20	37-40
7	18	22-25	24-29	21-22	41-44
8	19	26-27	30-35	23-24	45-49
9	20	28-30	36-39	25-26	50-53
10	21	31-32	40-44	27	54-58
11	22	33-34	45-48	28	59-62
12	23	35-36	49-51	29	63-66
13	—	37-39	52-54	30	67-70
14	24	40-41	55-57	31	71-74
15	25	42-43	58-59	32	75-76
16	—	44	60	—	77-78
17	—	45-46	61	—	79-83
18	26	47	62	33	84-87
19	—	48	—	—	88-93

AGE: 15-4-0 to 15-7-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-10	0	0-5	0-10	0-18
2	11-12	1-2	6-8	11-12	19-22
3	13-14	3-4	9-11	13-14	23-27
4	15	5-8	12-16	15-16	28-34
5	16	9-17	17-21	17-18	35-38
6	17	18-22	22-24	19-20	39-42
7	18-19	23-25	25-31	21-23	43-46
8	20	26-27	32-36	24-25	47-51
9	21	28-30	37-40	26	52-55
10	22	31-33	41-44	27	56-59
11	—	34-35	45-49	28-29	60-64
12	23	36-37	50-52	30	65-68
13	—	38-40	53-55	31	69-73
14	24	41	56-58	32	74-76
15	25	42-43	59	—	77-79
16	—	44	60	—	80-82
17	—	45-46	61	—	83-85
18	26	47	62	33	86-89
19	—	48	—	—	90-93

AGE: 15-0-0 to 15-3-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-10	0	0-5	0-10	0-18
2	11-12	1-2	6-8	11-12	19-22
3	13-14	3-4	9-11	13-14	23-26
4	15	5-7	12-15	15-16	27-32
5	16	8-17	16-20	17-18	33-37
6	17	18-22	21-23	19-20	38-41
7	18	23-25	24-30	21-23	42-45
8	19	26-27	31-35	24-25	46-50
9	20	28-30	36-40	26	51-54
10	21	31-33	41-44	27	55-58
11	22	34-35	45-48	28	59-63
12	23	36-37	49-52	29-30	64-67
13	—	38-40	53-55	31	68-71
14	24	41	56-58	32	72-75
15	25	42-43	59	—	76-77
16	—	44	60	—	78-80
17	—	45-46	61	—	81-84
18	26	47	62	33	85-88
19	—	48	—	—	89-93

AGE: 15-8-0 to 15-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-10	0	0-5	0-11	0-19
2	11-12	1-2	6-8	12	20-22
3	13-14	3-4	9-12	13-14	23-27
4	15	5-8	13-16	15-16	28-34
5	16	9-17	17-21	17-19	35-39
6	17	18-22	22-25	20-21	40-43
7	18-19	23-25	26-31	22-23	44-47
8	20	26-27	32-37	24-25	48-52
9	21	28-30	38-41	26	53-56
10	22	31-33	42-45	27	57-60
11	—	34-35	46-49	28-29	61-65
12	23	36-37	50-53	30	66-69
13	24	38-40	54-56	31	70-73
14	—	41	57-58	32	74-77
15	25	42-43	59-60	—	78-79
16	—	44	61	—	80-83
17	26	45-46	—	—	84-87
18	—	47	62	33	88-90
19	—	48	—	—	91-93

AGE: 16-0-0 to 16-3-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-10	0-1	0-5	0-11	0-19
2	11-12	2	6-8	12-13	20-22
3	13-14	3-4	9-12	14	23-28
4	15	5-9	13-17	15-16	29-35
5	16	10-18	18-22	17-19	36-40
6	17	19-22	23-26	20-21	41-44
7	18-19	23-25	27-32	22-23	45-48
8	20	26-27	33-37	24-25	49-53
9	21	28-30	38-41	26	54-57
10	22	31-33	42-45	27	58-60
11	—	34-35	46-50	28-29	61-66
12	23	36-37	51-53	30	67-70
13	24	38-40	54-56	31	71-74
14	—	41	57-58	32	75-78
15	25	42-43	59-60	—	79-80
16	—	44	61	—	81-84
17	26	45-46	—	—	85-88
18	—	47	62	33	89-91
19	—	48	—	—	92-93

AGE: 16-8-0 to 16-11-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-11	0-1	0-6	0-11	0-20
2	12	2-3	7-9	12-13	21-23
3	13-14	4-5	10-13	14	24-30
4	15	6-10	14-18	15-16	31-35
5	16	11-18	19-23	17-19	36-41
6	17	19-22	24-26	20-21	42-46
7	18-19	23-26	27-32	22-23	47-49
8	20	27-28	33-37	24-25	50-54
9	21	29-31	38-42	26	55-58
10	22	32-34	43-46	27	59-61
11	23	35	47-50	28-29	62-67
12	—	36-37	51-53	30	68-71
13	24	38-40	54-56	31	72-76
14	—	41	57-58	32	77-80
15	25	42-43	59-60	—	81-82
16	—	44	61	—	83-86
17	26	45-46	—	—	87-90
18	—	47	62	33	91-92
19	—	48	—	—	93

AGE: 16-4-0 to 16-7-30**Performance**

Scaled Score	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding
1	0-10	0-1	0-5	0-11	0-19
2	11-12	2	6-8	12-13	20-22
3	13-14	3-4	9-12	14	23-29
4	15	5-9	13-17	15-16	30-35
5	16	10-18	18-22	17-19	36-40
6	17	19-22	23-26	20-21	41-45
7	18-19	23-25	27-32	22-23	46-49
8	20	26-27	33-37	24-25	50-53
9	21	28-30	38-42	26	54-57
10	22	31-33	43-46	27	58-61
11	23	34-35	47-50	28-29	62-66
12	—	36-37	51-53	30	67-71
13	24	38-40	54-56	31	72-76
14	—	41	57-58	32	77-79
15	25	42-43	59-60	—	80-82
16	—	44	61	—	83-85
17	26	45-46	—	—	86-89
18	—	47	62	33	90-92
19	—	48	—	—	93

APPENDIX 7
Table for Converting Sum of Scaled Scores
on WISC-R into Performance IQ Scores

PERFORMANCE					
Sum of Scaled Scores	IQ	Sum of Scaled Scores	IQ	Sum of Scaled Scores	IQ
↓	↓	36	81	66	123
9	45	37	82	67	124
10	46	38	84	68	126
11	48	39	85	69	128
12	49	40	86	70	129
13	51	41	87	71	130
14	52	42	88	72	131
15	54	43	90	73	132
16	55	44	91	74	133
17	57	45	92	75	135
18	58	46	93	76	136
19	60	47	95	77	138
20	61	48	96	78	139
21	63	49	98	79	141
22	64	50	100	80	142
23	65	51	101	81	143
24	67	52	102	82	145
25	68	53	104	83	146
26	69	54	105	84	147
27	70	55	106	85	149
28	71	56	108	86	150
29	72	57	109	87	151
30	73	58	111	88	152
31	74	59	112	89	154
32	75	60	114	90	155
33	77	61	115		
34	78	62	117		
35	80	63	118		
		64	120		
		65	121		

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